

What is claimed is:

[Claim 1] 1. An optical pick-up head, comprising:

an optical lens set for focusing a laser beam onto an optical disc;
an actuator for fine-tuning the optical lens set comprising:
a first tracking coil set mounted on a first side of the optical lens set;
a second tracking coil set mounted on a second side of the optical lens set;
a first permanent magnet comprising at least two magnetic areas each comprising a different magnetic pole from the adjacent magnetic areas facing the first side of the optical lens and disposed at a distance; and
a second permanent magnet comprising at least two magnetic areas each comprising a different magnetic pole from the adjacent magnetic areas facing the second side of the optical lens and disposed at a distance.

[Claim 2] 2. The optical pick-up head of claim 1, further comprising a focusing coil mounted on the optical lens set, wherein a magnetic area of the first permanent magnet faces the optical lens set with the same magnetic pole as a corresponding magnetic area of the second permanent magnet faces the optical lens set.

[Claim 3] 3. The optical pick-up head of claim 1, further comprising a first focusing coil mounted on a first side of the optical lens set, a second focusing coil mounted on a second side of the optical lens set.

[Claim 4] 4. The optical pick-up head of claim 3, wherein a magnetic area of the first permanent magnet faces the optical lens set with the same magnetic pole as a corresponding magnetic area of the second permanent magnet faces the optical lens set.

[Claim 5] 5. The optical pick-up head of claim 3, wherein a magnetic area of the first permanent magnet faces the optical lens set with a different

magnetic pole as a corresponding magnetic area of the second permanent magnet faces the optical lens set.

[Claim 6] 6. The optical pick-up head of claim 1, wherein the first tracking coil set comprises a tracking coil and the first permanent magnet comprises two magnetic areas, a first magnetic area with magnetic field coverage corresponding to an outer part of the tracking coil and a second magnetic area with magnetic field coverage corresponding to the other part of the tracking coil.

[Claim 7] 7. The optical pick-up head of claim 6, wherein the second tracking coil set comprises a tracking coil and the second permanent magnet comprises two magnetic areas, a third magnetic area with magnetic field coverage corresponding to an outer part of the tracking coil and a third magnetic area with magnetic field coverage corresponding to the other part of the tracking coil.

[Claim 8] 8. The optical pick-up head of claim 1, wherein the first tracking coil set comprises two tracking coils and the first permanent magnet comprises two magnetic areas, a first magnetic area with magnetic field coverage corresponding to an outer part of a first tracking coil and a second magnetic area with magnetic field coverage corresponding to an inner part of the first tracking coil and an inner part of a second tracking coil.

[Claim 9] 9. The optical pick-up head of claim 8, wherein the second tracking coil set comprises two tracking coils and the second permanent magnet comprises two magnetic areas, a third magnetic area with magnetic field coverage corresponding to an outer part of a third tracking coil and a fourth magnetic area with magnetic field coverage corresponding to an inner part of the third tracking coil and an inner part of a fourth tracking coil.

[Claim 10] 10. The optical pick-up head of claim 1, wherein the first tracking coil set comprises two tracking coils, and the first permanent magnet comprises three magnetic areas, a first magnetic area with magnetic field coverage corresponding to an outer part of a first tracking coil, and a second magnetic area with magnetic field coverage corresponding to an inner part of the first tracking coil an inner part of a second tracking coil, and third magnetic areas with magnetic fields covering an outer part of the second tracking coil.

[Claim 11] 11. The optical pick-up head of claim 10, wherein the second tracking coil set comprises two tracking coils and the second permanent magnet comprises three magnetic areas, a fourth magnetic area with magnetic field coverage corresponding to an outer part of a third tracking coil, and a fifth magnetic area with magnetic field coverage corresponding to an inner part of the third tracking coil an inner part of a fourth tracking coil, and sixth magnetic areas with magnetic fields covering an outer part of the fourth tracking coil.

[Claim 12] 12. The optical pick-up head of claim 1, further comprising a laser diode for emitting a laser beam onto the optical disc through the optical lens set.

[Claim 13] 13. The optical pick-up head of claim 1, further comprising a photo detector for receiving a reflected laser beam from the optical disc through the optical lens set.

[Claim 14] 14. An actuator of an optical pick-up head, the optical pick-up head comprising an optical lens set, the actuator comprising:
a coil set mounted on one side of the optical lens set; and
a permanent magnet facing one side of the coil set at a distance, comprising at least two magnetic areas each comprising a different magnetic polar arrangement from the adjacent magnetic areas.

[Claim 15] 15. The actuator of claim 14, wherein the coil set comprises a coil and the permanent magnet comprises two magnetic areas, a first magnetic area with magnetic field coverage corresponding to an outer part of the coil, and second magnetic area with magnetic field coverage corresponding to the other part of the coil.

[Claim 16] 16. The actuator of claim 14, wherein the coil set comprises two coils and the permanent magnet comprises three magnetic areas, a first magnetic area with magnetic field coverage corresponding to an outer part of a first coil, second magnetic area with magnetic field coverage corresponding to an inner part of the first coil and an inner part of a second coil, and third magnetic areas with magnetic fields covering an outer part of the second coil.

[Claim 17] 17. The actuator of claim 14, wherein the coil set is a tracking coil set for fine-tuning the optical lens set.

[Claim 18] 18. The actuator of claim 14, wherein the optical pick-up head further comprises a laser diode for emitting a laser beam onto the optical disc through the optical lens set.

[Claim 19] 19. The actuator of claim 14, wherein the optical pick-up head further comprises a photo detector for receiving a reflected laser beam from the optical disc through the optical lens set.